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09/942,319	08/29/2001	Nobuo Sasaki	SCEI 15.928A	9745

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EXAMINER

CUNNINGHAM, GREGORY F

ART UNIT	PAPER NUMBER
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2676

DATE MAILED: 03/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/942,319

Applicant(s)

SASAKI, NOBUO

Examiner

Greg Cunningham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 January 2004.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) See Continuation Sheet is/are pending in the application.
4a) Of the above claim(s) See Continuation Sheet is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1,9-11,13-15,20,22-25,33-35,37-39,44,46-50,57-59,61-63 and 68-73 is/are rejected.
7) ☒ Claim(s) 2-7,16-19,26-31,40-43,50-55 and 64-67 is/are objected to.
8) ☒ Claim(s) See Continuation Sheet are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 29 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 09/286,866.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 3.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Continuation of Disposition of Claims: Claims pending in the application are 1-7,9-11,13-20,22-31,33-35,37-44,46-55,57-59,61-79,81-89,91-96,98-106,108-113,115-123 and 125-133.

Continuation of Disposition of Claims: Claims withdrawn from consideration are 74-79,81-89,91-96,98-106,108-113,115-123 and 125-133.

Continuation of Disposition of Claims: Claims subject to restriction and/or election requirement are 74-79,81-89,91-96,98-106,108-113,115-123 and 125-133.

DETAILED ACTION

1. This action is responsive to communications of election filed 01/05/2004.
2. The disposition of the claims is as follows: claims 1-7, 9-11, 13-20, 22-31, 33-35, 37-44, 46-55, 57-59, 61-79, 81-89, 91-96, 98-106, 108-113, 115-123 and 125-133 are pending in the application. Claims 1, 25, 49, 74, 91, 108, 125 and 133 are independent claims. Claims 8, 12, 21, 32, 36, 45, 56, 60, 80, 90, 97, 107, 114 and 124 have been cancelled in preliminary amendment.
3. Applicant has elected group I, claims 1-7, 9-11, 13-20, 22-31, 33-35, 37-44, 46-55, 57-59, 61-73. Applicant is also required to cancel non-elected claims 74-79, 81-89, 91-96, 98-106, 108-113, 115-123 and 125-133.
4. Examiner's note: Due to the symmetry of claims 45 and 69, where upon applicant has cancelled claim 45, suggests that applicant might also desire to cancel claim 69.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 9, 10, 22-25, 33, 34, 46-49, 57, 58 and 70-73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grossman et al., (US Patent Number 5,307,450), hereafter Grossman.

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A. Grossman discloses claim 25, “An image processing method for an image processing device which by processing an image defined by a combination of unit graphic forms, splits said unit graphic forms into multiple sub-unit graphic forms, the image processing method comprising: an interpolated line computation step [performs calculations – col. 5, lns. 52-53] of determining an interpolated line which is a line that interpolates a space between two vertices from an interpolation vector [These parameters are usually linearly interpolated between vertices – col. 5, lns. 57-58] used for determining a line that interpolates a space between a given vertex and another vertex of vertices of said unit graphic forms and from coordinates of said vertices; and an interpolated point computation step of determining, as the vertices of said sub-unit graphic forms, interpolated points which are points on said interpolated line. [col. 5, lns. 49-58; col. 11, ln. 52 – col. 12, ln. 16]” as [detailed].

B. Per independent claims 1 and 49, these are directed to a device and medium, respectively, for performing the method of independent claim 25, and therefore are rejected to independent claim 25.

C. Grossman discloses claim 33, “The image processing method as described in claim 25, wherein: said interpolation vectors at vertices of said unit graphic forms are normal-direction normal vectors of the shape to be realized by said unit graphic forms.[col. 3, lns. 56-62]” supra for claim 25 and as [detailed].

D. Per dependent claims 9 and 57, these are directed to a device and medium, respectively, for performing the method of dependent claim 33, and therefore are rejected to dependent claim 33.

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E. Grossman discloses claim 34, “The image processing method as described in claim 33, wherein: said interpolation vectors at the vertices of said unit graphic forms further include, in addition to said normal vectors, vectors which define directions of said interpolated lines at said vertices. [wherein line segment corresponds to vector]” supra for claim 33 and as detailed.

F. Per dependent claims 10 and 58, these are directed to a device and medium, respectively, for performing the method of dependent claim 34, and therefore are rejected to dependent claim 34.

G. Grossman discloses claim 46, “The image processing method as described in claim 25, wherein if the coordinates of the vertices of said unit graphic forms and the interpolation vectors are recorded on a recording medium, the image processing method further comprises a playback step of playing back from the recording medium the coordinates of said vertices and the interpolation vectors [col. 4, lns. 28-34; and col. 5, lns. 49-63]” Supra for claim 25 and as [detailed]. Wherein VRAM high capacity storage corresponds to recording medium and therefore retrievable “playback”.

H. Per dependent claims 22 and 70, these are directed to a device and medium, respectively, for performing the method of dependent claim 46, and therefore are rejected to dependent claim 46.

I. Grossman discloses claim 47, “The image processing method as described in claim 25, wherein if the coordinates of the vertices of said unit graphic forms and the interpolation vectors are transmitted via a transmission route, the image processing method further comprises a reception step of receiving the coordinates of said vertices and the interpolation vectors

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transmitted via the transmission route [col. 4, lns. 37-45]" supra for claim 25 and as [detailed].

Wherein [data bus interface] corresponds to "transmission route".

J. Per dependent claims 23 and 71, these are directed to a device and medium, respectively, for performing the method of dependent claim 47, and therefore are rejected to dependent claim 47.

K. Grossman discloses claim 48, "The image processing method as described in claim 25, wherein said image is a three-dimensional image, and said image processing device includes an operation means which is operated when a prescribed input is given, and the image processing method further comprising: a geometry processing step of reading data concerning said unit graphic forms from a recording medium and performing with respect to the data, geometry processing that corresponds to input from said operation means, a conversion step of converting said sub-unit graphic forms obtained by splitting said unit graphic forms resulting after said geometry processing into ones in the coordinate system of a two-dimensional output device, and a rendering step of rendering said sub-unit graphic forms converted by said conversion step [col. 1, lns. 15-20; and col. 4, lns. 54-64]" supra for claims 25 and 46 and as [detailed]. Wherein VRAM corresponds to recording and playback device.

L. Per dependent claims 24 and 72, these are directed to a device and medium, respectively, for performing the method of dependent claim 48, and therefore are rejected to dependent claim 48.

M. Grossman discloses claim 73, "The program distribution medium as described in claim 49, which also provides the coordinates of the vertices of said unit graphic forms and the

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interpolation vectors [col. 2, lns. 51-60; and col. 3, ln. 56 – col. 4, ln. 19]” supra for claim 49 and as [detailed].

7. Claims 11, 13, 14, 20, 35, 37, 38, 44, 59, 61, 62, 68 and 69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grossman et al., (US Patent Number 5,307,450), hereafter Grossman as applied to claims 1, 25 and 49 above, and further in view of Fowler, (US-PAT-NO: 6,108,011).

A. Grossman discloses claim 35, “The image processing method as described in claim 25, wherein: said interpolation vectors at the vertices of said unit graphic forms are interpolated line direction vectors which define directions of said interpolated lines at said vertices” supra for claim 25. However Grossman does not appear to disclose “wherein: said interpolation vectors at the vertices of said unit graphic forms are interpolated line direction vectors which define directions of said interpolated lines at said vertices”, but Fowler does in [col. 5, lns. 18-43; and col. 6, lns. 47-50]. Wherein, Fowler, a triangle corresponds to unit graphic form.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply Z-subdivision disclosed by Grossman in combination with shape interpolation disclosed by Fowler, and motivated to combine the teachings because “Key-frame interpolation is most often applied to sets of data that are single valued, such as a particular angle of rotation, or points in two- or three-dimensions. A more specific application, where the data posed and interpolated is a set of two- or three-dimensional geometric models is commonly referred to as "shape interpolation." as revealed by Fowler in col. 1, lines 54-60.

B. Per dependent claims 11 and 59, these are directed to a device and medium, respectively,

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for performing the method of dependent claim 35, and therefore are rejected to dependent claim 35.

C. Grossman discloses claim 37, “The image processing method as described in claim 35, wherein said interpolated line direction vectors are vectors that express the tangent direction of said interpolated lines at said vertices” supra for claim 35.

D. Per dependent claims 13 and 61, these are directed to a device and medium, respectively, for performing the method of dependent claim 37, and therefore are rejected to dependent claim 37.

E. Grossman discloses claim 38, “The image processing method as described in claim 25, and further comprising: an interpolation vector computation step of determining, from interpolation vectors at said vertices, the interpolation vector to be used for determining a line that interpolates the space between a given interpolated point and another interpolated point in said interpolated points” supra for claim 37. However Grossman does not appear to disclose “an interpolation vector computation step of determining, from interpolation vectors at said vertices, the interpolation vector to be used for determining a line that interpolates the space between a given interpolated point and another interpolated point in said interpolated points”, but Fowler does in [col. 10, ln. 53 – col. 13, ln. 22]. Wherein, Fowler, [between key points (P.sub.0,t.sub.0), (P.sub.1, t.sub.1), (P.sub.2,t.sub.2), and (P.sub.3,t.sub.3). The individual dots are the interpolated points.] correspond to interpolated points and [Fig. 8] corresponds to “computation step”.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply Z-subdivision disclosed by Grossman in combination with shape

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interpolation disclosed by Fowler, and motivated to combine the teachings because "Key-frame interpolation is most often applied to sets of data that are single valued, such as a particular angle of rotation, or points in two- or three-dimensions. A more specific application, where the data posed and interpolated is a set of two- or three-dimensional geometric models is commonly referred to as "shape interpolation." as revealed by Fowler in col. 1, lines 54-60.

F. Per dependent claims 14 and 62, these are directed to a device and medium, respectively, for performing the method of dependent claim 38, and therefore are rejected to dependent claim 38.

G. Grossman discloses claim 44, "The image processing method as described in claim 25, wherein said interpolated line is a Bezier curve" supra for claim 25. However Grossman does not appear to disclose "wherein said interpolated line is a Bezier curve", but Fowler does in [col. 2, lns. 18-29.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply Z-subdivision disclosed by Grossman in combination with shape interpolation and Bezier curves disclosed by Fowler, and motivated to combine the teachings because "Key-frame interpolation is most often applied to sets of data that are single valued, such as a particular angle of rotation, or points in two- or three-dimensions. A more specific application, where the data posed and interpolated is a set of two- or three-dimensional geometric models is commonly referred to as "shape interpolation." as revealed by Fowler in col. 1, lines 54-60.

H. Per dependent claims 20 and 68, these are directed to a device and medium, respectively,

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for performing the method of dependent claim 44, and therefore are rejected to dependent claim 44.

I. Grossman discloses claim 69, “The program distribution medium as described in claim 68, wherein said image is a three-dimensional image; and said interpolated line computation step includes: an angle computation step that determines angle 1 or 2 formed by a straight line that joins one vertex and another vertex interpolated by said interpolated line, which is said Bezier curve, and each projection of the straight line onto a plane perpendicular to the interpolation vector at said one vertex or other vertex, which is a plane that includes said one vertex or other vertex, a distance computation step that determines, based on said angles 1 and 2, a control edge length 1 or 2, which is the distance from said one vertex or other vertex to control point 1 or 2 of said Bezier curve, and a Bezier curve computation step that determines said Bezier curve as the interpolated line that interpolates the space between said one vertex and other vertex by determining, based on said control edge length 1 or 2, each said control point 1 and 2” supra for claim 68. However Grossman does not appear to disclose “wherein said image is a three-dimensional image; and said interpolated line computation step includes: an angle computation step that determines angle 1 or 2 formed by a straight line that joins one vertex and another vertex interpolated by said interpolated line, which is said Bezier curve, and each projection of the straight line onto a plane perpendicular to the interpolation vector at said one vertex or other vertex, which is a plane that includes said one vertex or other vertex, a distance computation step that determines, based on said angles 1 and 2, a control edge length 1 or 2, which is the distance from said one vertex or other vertex to control point 1 or 2 of said Bezier curve, and a Bezier curve computation step that determines said Bezier curve as the interpolated line that interpolates

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the space between said one vertex and other vertex by determining, based on said control edge length 1 or 2, each said control point 1 and 2", but Fowler does in [col. 1, lns. 51-60; col. 2, lns. 18-29; and Fig. 8].

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply Z-subdivision disclosed by Grossman in combination with shape interpolation and Bezier curves disclosed by Fowler, and motivated to combine the teachings because "Key-frame interpolation is most often applied to sets of data that are single valued, such as a particular angle of rotation, or points in two- or three-dimensions. A more specific application, where the data posed and interpolated is a set of two- or three-dimensional geometric models is commonly referred to as "shape interpolation." as revealed by Fowler in col. 1, lines 54-60.

8. Claims 15, 39 and 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grossman et al., (US Patent Number 5,307,450), hereafter Grossman as applied to claims 1, 25 and 49 above, further in view of Fowler, (US-PAT-NO: 6,108,011) as applied to claims 14, 38 and 62 above. and further in view of Horikawa et al., (US Patent 6,326,968 B1), hereafter Horikawa.

A. Grossman and Fowler discloses claim 39, "The image processing method as described in claim 38, wherein when the ratio of values corresponding to a distance from said interpolated point between one vertex and another vertex to said one vertex or to the other vertex, respectively, is denoted by $t:1-t$, said interpolation vector computation step determines as the interpolation vector at said interpolated point a result corresponding to the sum of $(1-t)$ times the interpolation vector at said one vertex plus t times the interpolation vector at said other vertex."

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supra in claim 38. However they do not appear to disclose “wherein when the ratio of values corresponding to a distance from said interpolated point between one vertex and another vertex to said one vertex or to the other vertex, respectively, is denoted by $t:1-t$, said interpolation vector computation step determines as the interpolation vector at said interpolated point a result corresponding to the sum of $(1-t)$ times the interpolation vector at said one vertex plus t times the interpolation vector at said other vertex”, but Horikawa does in [col. 5, lns. 21-34; and col. 9, lns. 25-33].

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply Z-subdivision disclosed by Grossman in combination with shape interpolation disclosed by Fowler, coupled with ratio denoted by $(1-t)$ disclosed by Horikawa, and motivated to combine the teachings because it would “enable approximation of a geometric model used for CG in a state that normal vectors are appended, and which enable prevention of distortion of the normal vectors in approximation results” as revealed by Horikawa in col. 2, lines 20-23.

B. Per dependent claims 15 and 63, these are directed to a device and medium, respectively, for performing the method of dependent claim 39, and therefore are rejected to dependent claim 39.

Allowable Subject Matter

9. Claims 2-7, 16-19 26-31, 40-43, 50-55 and 64-67 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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Responses

10. Responses to this action should be mailed to: Commissioner of Patents and Trademarks, Washington, D.C. 20231. If applicant desires to fax a response, (703) 308-9051 may be used for formal communications or (703) 308-6606 for informal or draft communications.

Please label "PROPOSED" or "DRAFT" for informal facsimile communications. Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA., Sixth Floor (Receptionist).

Inquiries

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Greg Cunningham whose telephone number is (703) 308-6109.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella, can be reached on (703) 308-6829.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 872-9306 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

J.F. Cunningham

March 8, 2004

gfc

Matthew C. Bella

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